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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,443	01/06/2004	Hongmei Wang	M4065.0536/P536-B	2565
24998	7590	03/21/2005		
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP 2101 L Street, NW Washington, DC 20037			EXAMINER PIZARRO CRESPO, MARCOS D	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 03/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	Application No. 10/751,443	Applicant(s) WANG ET AL.	
	Examiner Marcos D. Pizarro-Crespo	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 27-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/6/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

Application/Control Number: 10/751,443 (Non-Final Rejection)  
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Attorney's Docket Number: M4065.0536/P536-B

Filing Date: 1/6/2004

Claimed Priority Dates: 11/26/2002 (Continuation of 10/303,696)  
6/5/2002 (Divisional of 10/161,615)

Applicant(s): Wang, et al.

Examiner: Marcos D. Pizarro-Crespo

### **DETAILED ACTION**

This Office action responds to the preliminary amendment filed on 1/6/2004.

#### ***Acknowledgment***

1. The preliminary amendment filed on 1/6/2004 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 27-35.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu (US 6484065) in view of Houston (US 6424016).

5. Regarding claim 27, Yu (see, e.g., fig. 1) shows most aspects of the instant invention including a processor-based system **100** comprising

- A processor **110**
- An integrated circuit **120** coupled to the processor **110**

wherein the circuit comprises a transistor, the transistor comprising source/drain regions of a first conductivity type and a gate stack including a conductive layer.

Although not explicitly stated, Yu shows the circuit including DRAM banks **120a-d**, which by definition are made of transistors, each with its respective first-conductivity-type source/drain regions and conductive-layer gate stack.

Yu, however, fails to specify that the source/drain regions and the gate stack be provided on an SOI substrate, wherein the conductive layer of the gate stack is of a second conductivity type.

Houston (see, e.g., col.1/ll.14-25), on the other hand, teaches that SOI substrates are good for DRAMs for several reasons. One reason is that SOIs have lower collection volumes.

Like Yu, Houston (see, e.g., figs. 5 and 6) also shows DRAMs including transistors having source/drain regions of a first conductivity type and a gate stack **40** including a conductive layer.

Houston (see, e.g., col.4/ll.54-58) additionally shows the conductive layer of the gate stack having a second conductivity type.

It would have been obvious at the time of the invention to one of ordinary skill in the art to have Yu's gate stack and source/drain regions provided on an SOI substrate, wherein the gate stack has a second conductivity type, as suggested by Houston, to lower the collection volume of the integrated circuit.

6. Regarding claim 28, Houston shows the transistor is a fully depleted SOI transistor **41** (see, e.g., figs. 5 and 6).

7. Regarding claim 29, Houston shows the fully depleted SOI transistor is an NMOS transistor (see, e.g., col.5/ll.52).

8. Regarding claim 30, Houston shows that the first conductivity is n-type and the second conductivity is p-type (see, e.g., col.5/ll.52-53).

9. Regarding claim 31, Houston shows that the first conductivity is p-type and the second conductivity is n-type (see, e.g., col.5/ll.39-40).

10. Regarding claim 32, Houston shows that the conductive layer of the gate stack is a doped polysilicon layer (see, e.g., col.5/ll.50).

11. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yu/Houston in view of Krivokapic (US 6452229).

12. Regarding claim 33, Yu/Houston shows most aspects of the instant invention (see, e.g., paragraphs 5-10 above), except for the conductive layer being doped silicon/germanium.

Krivokapic, on the other hand, teaches (see, e.g., col.4/ll.1-7) that doped silicon/germanium is an equivalent gate material to the doped polysilicon of Yu/Houston.

Therefore, because these two gate materials were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute Yu/Houston's doped polysilicon for the doped silicon/germanium that Krivokapic suggested.

13. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu/Houston in view of Wu (US 6060749).

14. Regarding claims 34 and 35, Yu/Houston shows most aspects of the instant invention (see, e.g., paragraphs 5-10 above), except for the gate stack further comprising a silicide layer or a cap layer over the conductive layer.

Wu (see, e.g., col.5/ll.9-18), on the other hand, teaches that having a silicide cap layer over Yu/Houston's polysilicon gate will reduce the parasitic resistance of the gate.

It would have been obvious at the time of the invention to one of ordinary skill in the art to form a silicide cap layer over Yu/Houston's polysilicon layer, as suggested by Wu, to reduce the parasitic resistance of the gate.

### ***Conclusion***

15. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 872-9306**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 9:30 AM to 8:00 PM (Eastern Standard Time) Monday through Thursday or by e-mail via [Marcos.Pizarro@uspto.gov](mailto:Marcos.Pizarro@uspto.gov). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

17. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 2814

18. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/347-354,407	3/15/2005
Other Documentation: PLUS Analysis	3/15/2005
Electronic Database(s): EAST (USPAT, EPO, JPO)	3/15/2005

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